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(54) Movable armrest and seat equipped therewith

(57) The invention relates to an armrest for a seat, comprising a support for connecting to a frame of the seat and a supporting part which is connected movably thereto and which is slidable in two directions and pivotable about at least one axis, wherein the sliding movement and the pivoting movement can be performed independently of each other.

The supporting part or the support comprises a protrusion which is received movably in a recess in the support or the supporting part, wherein the dimensions of the recess in the two sliding directions are greater than those of the protrusion received therein, and wherein the bounding means are formed by a peripheral edge of the recess.

The invention also relates to an armrest of which the supporting part is relatively soft, for instance in that it takes a hollow form. The supporting part can herein be formed from two segments formed by injection moulding and connected by an injection moulded edge, of which the segment directed outward during use is softer than the other segment.

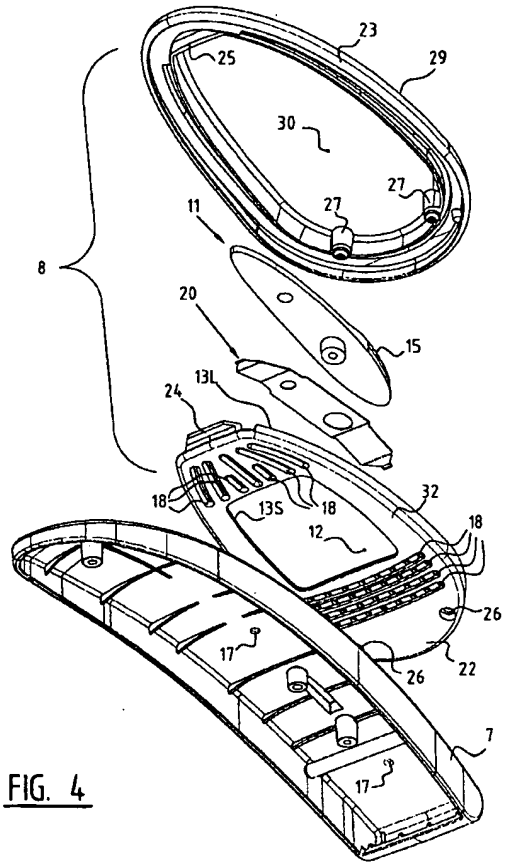

FIG. 4

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Description

[0001] The invention relates to an armrest for a seat, in particular an office chair, comprising at least one support for connecting to a frame of the seat and at least one supporting part connected movably thereto. Such an armrest is generally known.

[0002] Armrests form an important component in the design of a seat. They serve a dual role. On the one hand the armrests serve to support the weight of the arm and the shoulder so as to thus prevent this weight having to be supported by the back, which can result in an incorrect sitting posture. In addition, armrests serve to stabilize the arms, which have a relatively crude motor function, in performing movements using the wrists, hands and fingers, which have a considerably more refined motor function. This latter function is of particularly great importance when working with a keyboard or mouse, where the greater part of the operations must after all be carried out with the fingers or wrist.

[0003] In view of the fact that armrests thus play a significant part in finding an optimum working posture, it is of great importance that they are as well adjustable as possible, so that any user of a seat can readily adapt the armrests to his or her wishes. In addition, it is important that the armrests provide a good support and are comfortable.

[0004] Most known armrests are in any case height-adjustable. Armrests are also known which are adjustable in depth direction, i.e. toward and away from the backrest, usually in that they are slidable. Also known are armrests which are adjustable in transverse direction. This adjustability is then often achieved by sliding the support relative to the frame of the seat. Finally, armrests are known with a support which is pivotable around a standing axis, whereby the armrest is thus displaceable in transverse direction while the direction of the armrest can simultaneously be varied.

[0005] With an eye to support and comfort, most armrests are profiled and rounded to a greater or lesser extent. Furthermore, armrests are often manufactured from, or covered with, a material which feels relatively soft or which really is soft, such as for instance a foam plastic. Such materials have the drawback of being not easy to process and moreover being vulnerable.

[0006] The invention now has for its object to provide an improved armrest of the above described type. According to a first aspect of the invention this is achieved in such an armrest in that the supporting part is slidable in at least two directions and pivotable about at least one axis. A larger number of adjustments options is hereby provided than is the case in known armrests.

[0007] The supporting part preferably defines a support plane and is slidable substantially parallel to the support plane, and the pivot axis is directed substantially perpendicularly of the support plane. In this manner the supporting part can be adjusted in length or depth direction and in width direction, while the orientation of the armrest can moreover be modified relative to the seat.

[0008] The sliding movement and the pivoting movement can advantageously be performed independently of each other herein. A desired setting can thus be sought for each parameter without the already set values of other parameters thereby being lost.

[0009] In order to prevent the components detaching at the end of their movement, the armrest preferably comprises means for bounding at least a part of the movement(s) of the supporting part.

[0010] An embodiment of the armrest which is structurally simple to embody is obtained when the supporting part or the support comprises at least one protrusion which is received movably in a recess in the support or the supporting part, wherein the dimensions of the recess in the two sliding directions are greater than those of the protrusion received therein, and wherein the bounding means are formed by a peripheral edge of the recess. The peripheral edge herein advantageously has a contour corresponding with the desired movement(s).

[0011] When the protrusion and the peripheral edge of the recess take a stepped form, wherein each step of the peripheral edge has a contour corresponding with a part of the desired movement(s), different movement patterns of the components can be defined.

[0012] So as to prevent a position, once adjusted, being lost, the armrest can be provided with means for blocking the supporting part in a determined position. A robust and simple embodiment is achieved here when the blocking means are formed by co-acting surface parts of the supporting part and the support directed towards each other. The support can for instance have at least one protruding projection and the supporting part a number of cavities co-acting therewith. When the armrest of the seat is loaded the blocking means are hereby pressed together. The cavities can herein be distributed over the supporting part in a particular pattern to enable blocking in a large number of positions. There can further be resilient means for biasing the blocking means to their blocking position.

[0013] According to a second aspect the invention provides an armrest, the supporting part of which is relatively soft. An optimal combination of support and comfort is hereby provided. When the supporting part herein takes a hollow form it can be resiliently movable, wherein air in the hollow space functions as resilient and damping medium. The resilience or softness can moreover then be adjusted as desired by at least partially filling the hollow space with another, preferably resiliently deformable medium.

[0014] The supporting part is advantageously formed from at least two segments, of which the segment directed outward during use is softer than the other segment, so that the armrest also feels soft.

[0015] An embodiment which is simple in terms of production engineering is obtained when the segments are formed by injection moulding. For a robust connection the segments can be fixed to each other by an injection

moulded edge.

[0016] In order to increase user comfort an end of the supporting part directed toward the backrest of the seat is formed such that only a lower arm of the user is supported, and not his/her elbow. This end can for instance be rounded for this purpose.

[0017] Finally, the invention also relates to a seat provided with a frame bearing at least one seat part and with at least one armrest of the type described here.

[0018] The invention is elucidated hereinbelow on the basis of an embodiment, wherein reference is made to the annexed drawing, in which:

Fig. 1 shows a perspective view of an office chair provided with a pair of armrests according to the invention,
Fig. 2 is a perspective view of one of the armrests of the seat of fig. 1 in a neutral position,
Fig. 3A-D show different movements of the armrest,
Fig. 4 is a perspective view of the armrest with exploded parts,
Fig. 5 is a cross-sectional perspective view in which the support with the protrusion and the supporting part with the recess are shown schematically,
Fig. 6 is a cross-sectional perspective view of the armrest, and
Fig. 7 is a bottom view of the supporting part having therein the cavities which form part of the blocking means.

[0019] A seat (fig. 1) comprises a frame 2 on which a seat part 3 and a backrest 4 are mounted. Frame 2 is carried by a mobile undercarriage 5. Seat 1 is provided with the usual mechanisms for height and depth adjustment of seat part 3 and backrest 4.

[0020] Seat 1 also has two armrests 6 on either side of seat part 3. Each armrest 6 is formed by a support 7 mounted on frame 2 of seat 1, and a supporting part 8 which is movably connected to support 7. Each support 7 consists of an L-shaped lower part 9 and a reverse L-shaped upper part 10 which is height-adjustable relative to lower part 9. Lower part 9 is in turn connected in conventional manner to frame 2 for adjustment in width direction.

[0021] Supporting part 8 defines a substantially horizontally directed support plane S (fig. 2) and in the shown embodiment is slidable substantially parallel to this support plane S in two directions D and W for adjusting the desired depth respectively the desired width of supporting part 8 of armrest 6. In addition, supporting part 8 is pivotable as according to arrow R about an axis directed transversely of support plane S. An optimum adjustability of armrest 6 is achieved by thus embodying supporting part 8 for movement in multiple directions relative to support 7.

[0022] The different movements of the supporting part relative to support 7 can be performed independently of each other. In the shown embodiment support 7 is provided for this purpose with a protrusion 11 which is received for movement in different ways in a recess 12 in supporting part 8. The dimensions of recess 12 in directions D and W are greater than those of protrusion 11, so that protrusion 11 can be displaced in the recess in these directions, and can moreover be rotated. The different movements are bounded by a peripheral edge 13 of recess 12 with which the protrusion 11 comes into contact. The contour of peripheral edge 13 thus defines the possible patterns of movement of supporting part 8 relative to support 7.

[0023] In order to allow different well-defined movements the protrusion 11 and the edge 13 of recess 12 each take a stepped form in the shown embodiment (fig. 5). Protrusion 11 herein takes the form of a toadstool with a stem 14 and a corresponding cap 15. Recess 12 has a comparatively smaller surface area 12S in the vicinity of support 7 and a larger surface area 12W at a greater distance from the support, and therefore has in fact a narrowed opening. The largest dimension inside peripheral edge 13S of this narrowed portion is herein smaller than the largest dimension of cap 15 of protrusion 11, so that protrusion 11 is enclosed in recess 12. The possible movements of supporting part 8 are then defined on the one hand by the outer periphery of cap 15 in combination with the contour of peripheral edge 13L of the large portion of recess 12 and on the other by the outer periphery of stem 14 and peripheral edge 13S of the narrowed portion of the recess. In the shown embodiment the inner step 13S of the peripheral edge is herein practically right-angled, while outer step 13L, cap 15 and stem 14, which is defined by two screw sleeves 16, have an oval or elliptical form.

[0024] It is desirable that armrest 6 retains a position, once it has been set, until these settings are consciously changed. Present for this purpose are means for blocking supporting part 8 in a determined position relative to support 7. These blocking means are formed here by projections 17 on the surface 19 of support 7 directed toward supporting part 8, and cavities 18 co-acting therewith in the surface 32 of supporting part 8 directed toward support 7.

[0025] Forming of projections 17 and cavities 18 on/in these surfaces 19, 32 ensures that blocking means 17 act under load when supporting part 8 is pressed with force onto support 7. In order to ensure that blocking means 17 remain active when armrest 6 is not loaded, resilient biasing means 20 are provided. These biasing means 20 are formed here by a compression spring arranged between the underside of the cap 15 of protrusion 11 and a surface 21 between the two peripheral edges 13S, 13L.

[0026] Cavities 18 of the blocking means can be formed in a determined pattern in surface 32, for instance in rows (in width direction W) and columns (in length or depth direction D) (fig. 6), and can be mutually separated by standing edges 33. Formed at regular mutual distance in the cavities 19 extending in width direc-

tion W are obstacles or studs 34, the height of which is smaller than the depth of cavities 18. By removing supporting part 8 slightly from support 7 counter to the action of biasing means 20, projections 17 can be lifted out of cavities 18 and supporting part 8 can be moved. For displacement of the supporting part in width direction W or in depth direction D, supporting part 8 must herein be lifted over the full depth of cavities 19 in order to displace projections 17 over one or more standing edges 33. This movement is hereby relatively heavy, and a position, once set, is therefore not easily changed. However, because studs 34 do not extend over the whole depth of cavities 18, the supporting part 8 need be lifted less far for a rotation movement. The projection 17 situated in one of the cavities 18D extending in depth direction will herein remain in place, while the other projection 17 inside the same cavity 19W is displaced over one or more studs 34. In this manner the direction of supporting part 8 in relation to support 7 is changed without the set positions in width and depth direction W, D therein being lost. These latter settings are as it were primary settings, while the direction of supporting part 8 in relation to the support is a secondary setting.

[0027] Because protrusion 11 is enclosed in recess 12 in the shown embodiment of armrest 6, supporting part 8 takes a divided form, while protrusion 11 is embodied as a component mounted separately on support 7. Supporting part 8 comprises a lower cap 22, which is directed toward support 7 and bears peripheral edges 13S, 13L, as well as an upper cap 23 which is connected releasably thereto and defines the actual support plane S. Upper cap 23 is here fixed to lower cap 22 by means of mutually engaging hook parts 24, 25 and screws which are rotated from the underside through openings 26, 27 into lower cap 22 and into upper cap 23.

[0028] It is of great importance for the comfort of the armrest 6 that it feels relatively soft and is moreover resiliently deformable. For this purpose at least that part of supporting part 8 which defines the actual support plane S is manufactured from a plastic with a comfortable feel. With a view to the deformability, the upper cap 23 likewise takes a divided form, wherein a hollow space 28 is left clear between the lower and upper part 29, 30 of upper cap 23. In the simplest embodiment air will be enclosed in this hollow space, although it is also possible here to include another medium therein. Both parts 29, 30 are herein formed by injection moulding and mutually connected by a hermetically sealed, all-around connecting edge 31, which can likewise be formed by injection moulding. An armrest 6 is thus obtained which is relatively soft and which thus adapts to a user, which feels comfortable but which is still less vulnerable than known armrests of foam plastic.

[0029] The comfort of armrest 6 is further enhanced by the design thereof. In the shown embodiment the end directed toward backrest 4 is rounded such that the lower arm of a user rests on armrest 6, but not his/her elbow. This results in a more comfortable support of the arm.

[0030] The invention thus provides an armrest which is readily adjustable in many ways, retains a position, once set, in both unloaded and loaded state, and which can be manufactured comparatively quickly with simple means and at low cost.

[0031] Although the invention is elucidated above with reference to one embodiment, it is not limited thereto. The supporting part could thus execute movements relative to the support other than the described sliding and pivoting movements. The positions of the protrusion and the recess could also be reversed, while these components could also be embodied with a constant surface area instead of in stepped form. In addition, other variants of the blocking means can be envisaged, while the construction of for instance the supporting part or the upper cap thereof can also be modified. The invention is therefore defined solely by the appended claims.

Claims

1. Armrest for a seat, in particular an office chair, comprising at least one support for connecting to a frame of the seat and at least one supporting part connected movably thereto, **characterized in that** the supporting part is slidable in at least two directions and pivotable about at least one axis.

2. Armrest as claimed in claim 1, **characterized in that** the supporting part defines a support plane and is slidable substantially parallel to the support plane, and the pivot axis is directed substantially perpendicularly of the support plane.

3. Armrest as claimed in claim 1 or 2, **characterized in that** the sliding movement and the pivoting movement can be performed independently of each other.

4. Armrest as claimed in any of the foregoing claims, **characterized by** means for bounding at least a part of the movement(s) of the supporting part.

5. Armrest as claimed in claim 4, **characterized in that** the supporting part or the support comprises at least one protrusion which is received movably in a recess in the support or the supporting part, wherein the dimensions of the recess in the two sliding directions are greater than those of the protrusion received therein, and wherein the bounding means are formed by a peripheral edge of the recess.

6. Armrest as claimed in claim 5, **characterized in that** the peripheral edge has a contour corresponding with the desired movement (s).

7. Armrest as claimed in claim 6, **characterized in that** the protrusion and the peripheral edge of the recess take a stepped form, wherein each step of the peripheral edge has a contour corresponding with a part of the desired movement(s).

8. Armrest as claimed in any of the foregoing claims, **characterized by** means for blocking the supporting part in a determined position.

9. Armrest as claimed in claim 8, **characterized in that** the blocking means are formed by co-acting surface parts of the supporting part and the support directed towards each other.

10. Armrest as claimed in claim 9, **characterized in that** the support has at least one protruding projection and the supporting part a number of cavities co-acting therewith.

11. Armrest as claimed in claim 10, **characterized in that** the cavities are distributed over the supporting part in a particular pattern.

12. Armrest as claimed in any of the foregoing claims or according to the preamble of claim 1, **characterized in that** the supporting part is relatively soft.

13. Armrest as claimed in claim 12, **characterized in that** the supporting part takes a hollow form.

14. Armrest as claimed in claim 13, **characterized in that** the supporting part is formed from at least two segments, of which the segment directed outward during use is softer than the other segment.

15. Armrest as claimed in claim 14, **characterized in that** the segments are formed by injection moulding.

16. Armrest as claimed in claim 14 or 15, **characterized in that** the segments are fixed to each other by an injection moulded edge.

17. Armrest as claimed in any of the claims 13-16, **characterized in that** the hollow supporting part is at least partially filled with a resiliently deformable medium.

18. Armrest as claimed in any of the foregoing claims or according to the preamble of claim 1, **characterized in that** an end of the supporting part directed toward a backrest of the seat is formed such that only a lower arm of a user is supported.

19. Seat provided with a frame bearing at least one seat part in addition to at least one armrest as claimed in any of the foregoing claims.

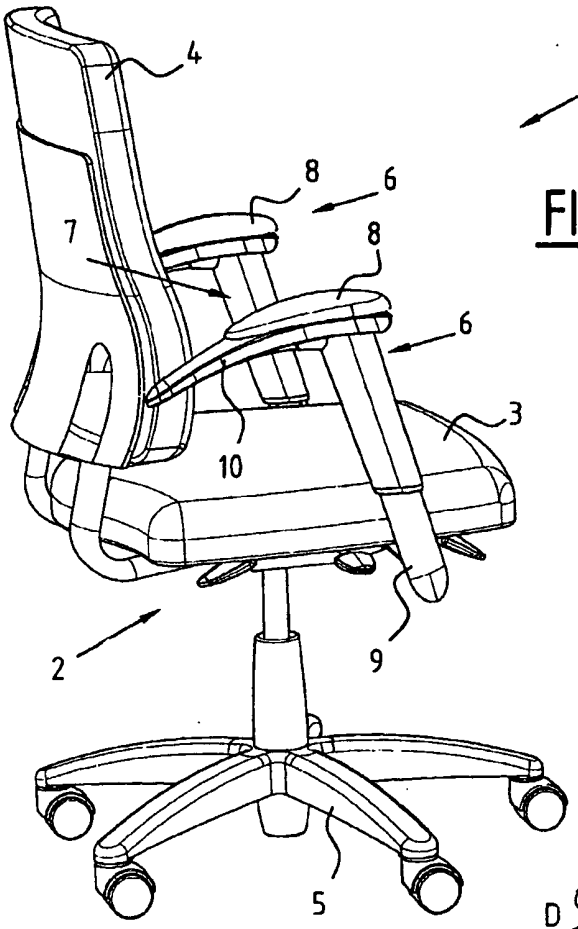

FIG. 1

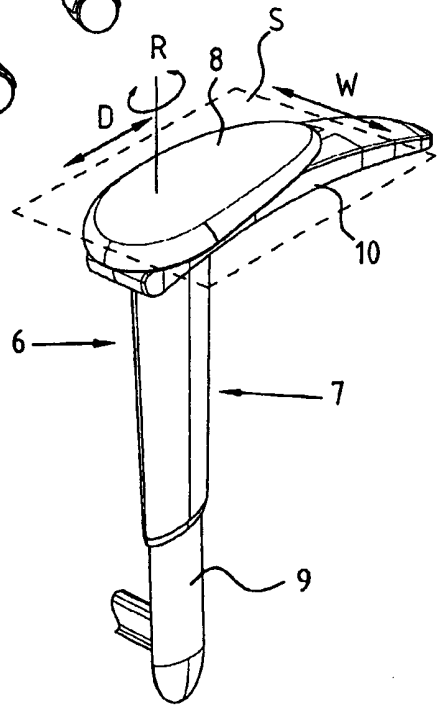

FIG. 2

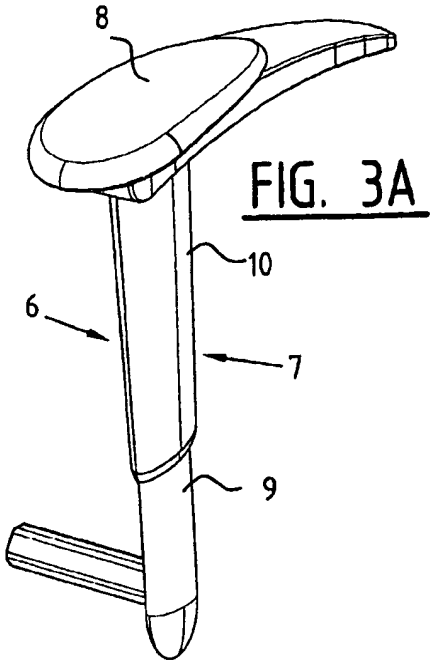

FIG. 3A

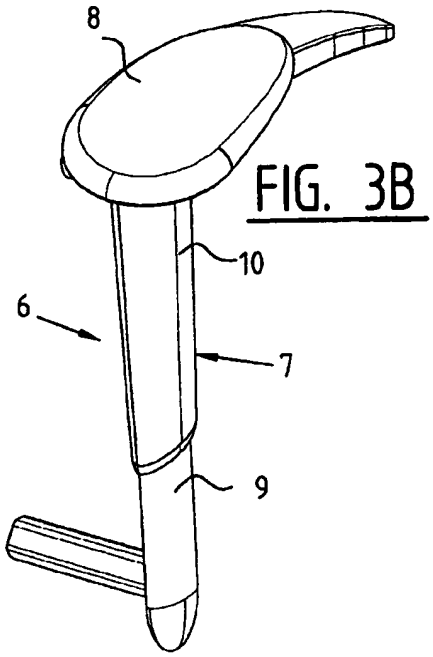

FIG. 3B

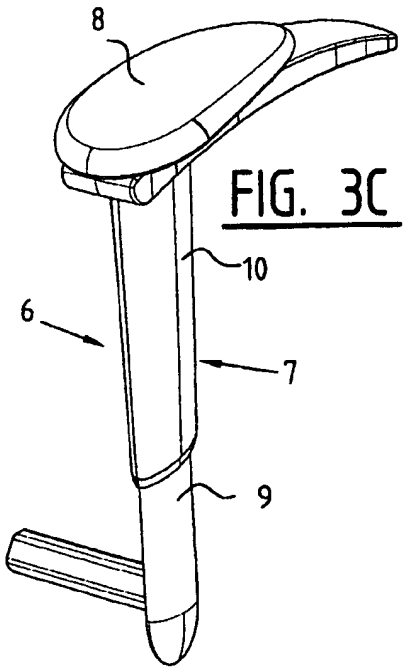

FIG. 3C

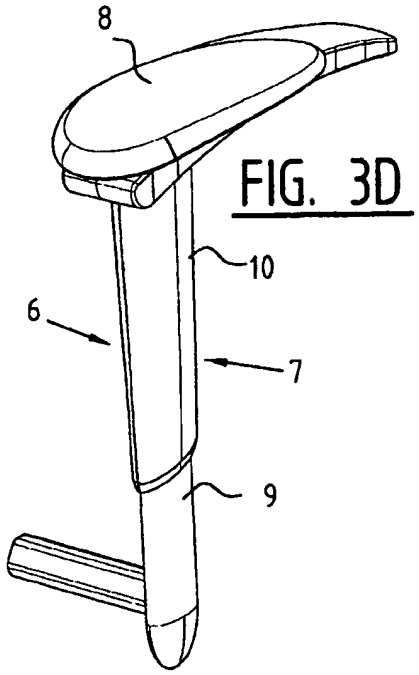

FIG. 3D

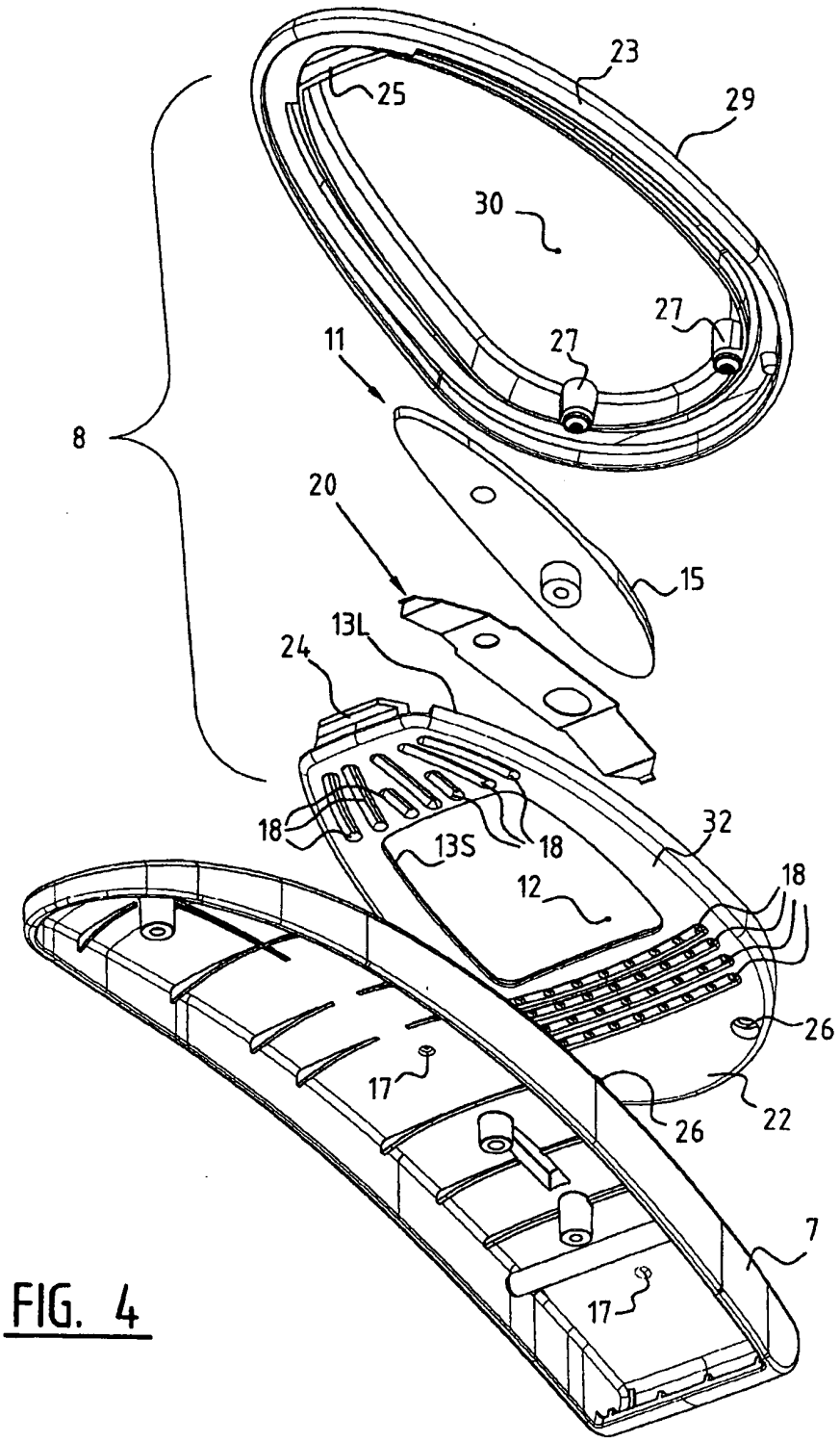

FIG. 4

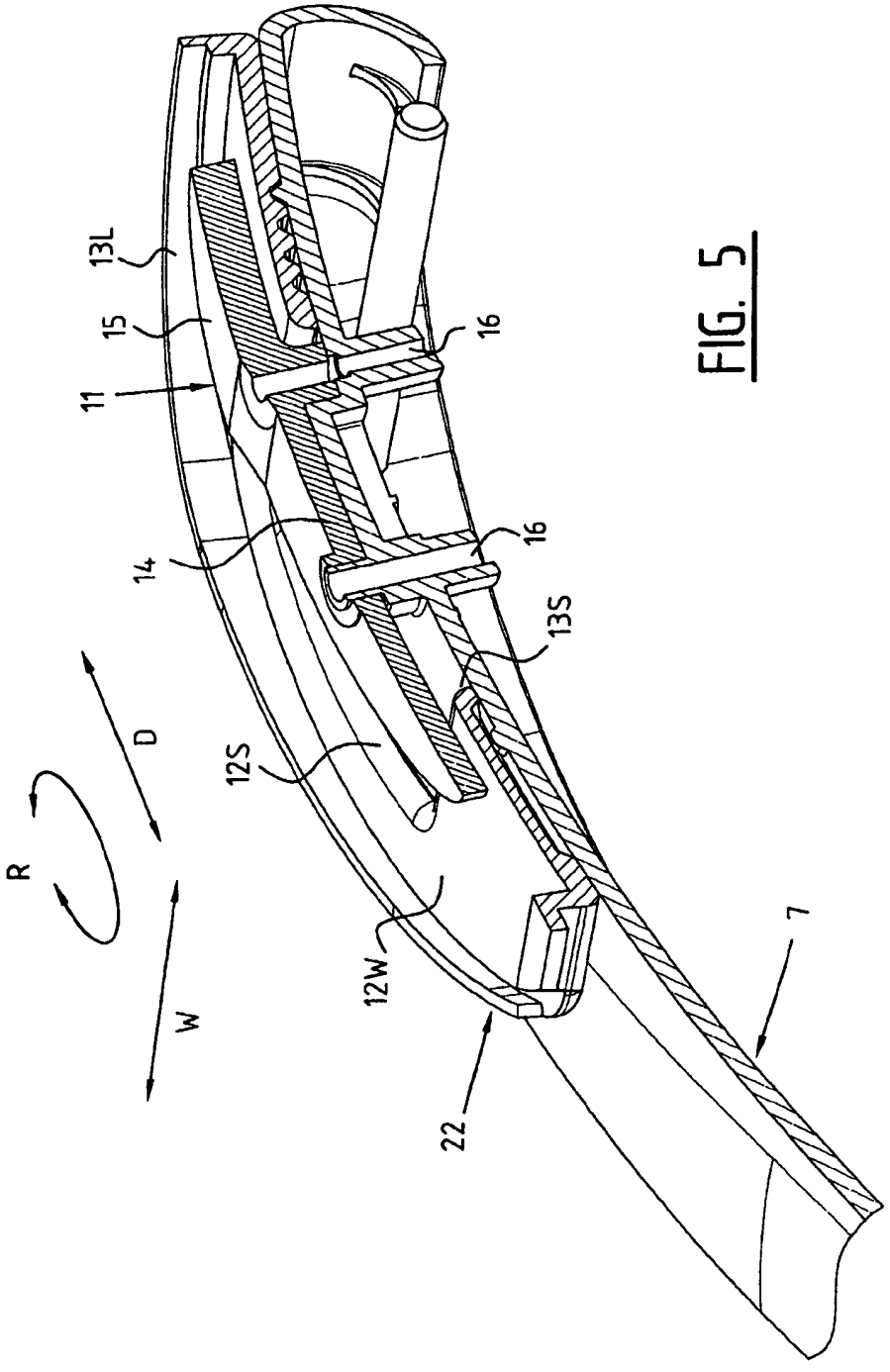

FIG. 5

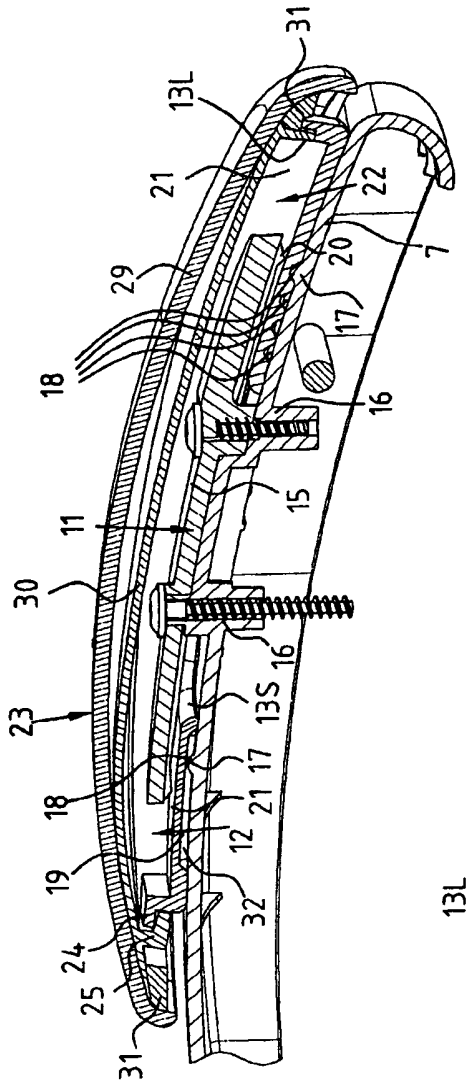
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FIG. 6

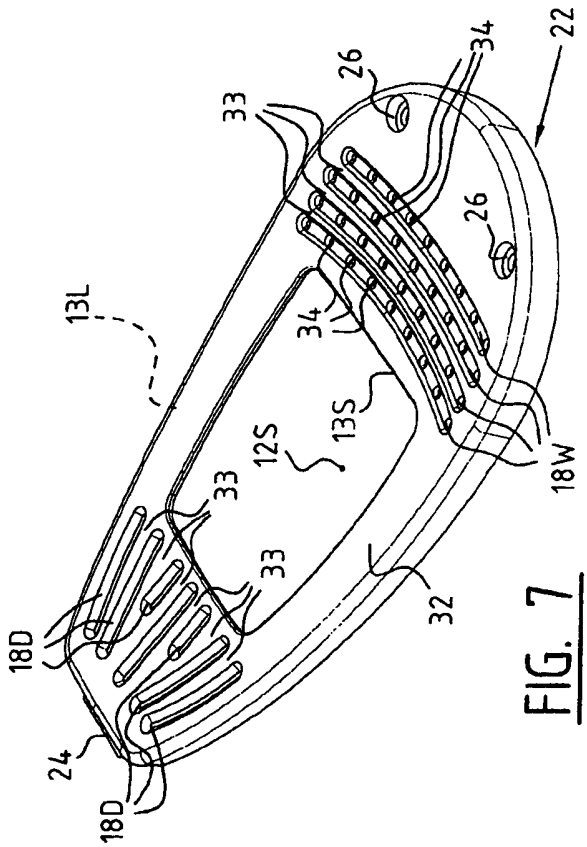
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FIG. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 07 8494

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 November 2002	Joosting, T

CATEGORY OF CITED DOCUMENTS

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